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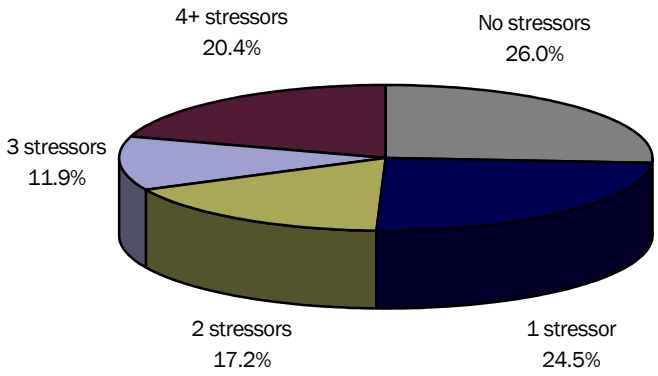
MI PRAMS Delivery

Stress Experienced in the Year Prior to Delivery of an Infant

A substantial body of research indicates that prenatal stress is a significant risk factor for adverse birth outcomes, and may partially account for the racial disparity in these outcomes. Socioeconomic status (SES) is regularly provided as the explanation for racial disparities in maternal and child health; however, investigators have found that disparities persist regardless of level of SES. An examination of stress during pregnancy offers a more holistic view of women's lives, particularly with respect to adverse birth outcomes.

Stress is viewed as a function of person-environment interaction in that a person perceives environmental demands to be greater than her available biological, social, and psychological resources. A woman's perceptions then appear to be translated to adverse birth outcomes through a complex web of behavioral and biological mechanisms (see Box). Stress may come from a variety of sources, including the workplace, personal relationships, unstable finances, and housing problems, and may be exacerbated by pregnancy.

Figure 1. Number of Life Event Stressors Experienced by Women During Pregnancy, Michigan, 1996-2000



The Pregnancy Assessment Monitoring System assesses prenatal stress through a 13-item inventory of stress-inducing life events. These events generally fall into four categories: emotional (family member ill, someone close to mother died); partner-associated (separation or divorce, more arguments with husband or partner during pregnancy than usual, husband or partner did not want woman to be pregnant); financial (moved to a new address, husband or partner lost job, mother lost job, mother had bills she was unable to pay); and traumatic (mother was homeless, was involved in a physical fight, mother or husband or partner went to jail, someone close to mother had drinking or drug problem).

Overall, 74.0 percent of Michigan mothers reported experiencing at least one stressor: 24.5 percent

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Special points of interest:

- Nearly three-quarters of women in Michigan reported experiencing at least one life event stressor during pregnancy.
- 20.4 percent of women reported experiencing four or more stressors.
- The most common type of stressor reported is financial (51.9 percent) and the most common individual stressor reported is moving to a new address (35.9 percent).
- Women who were black, who were 20 years old or younger, and who had less than a high school education reported greater numbers of stressors and were more likely to report experiencing each of the particular types of stressors.

Stress and Adverse Birth Outcomes: Literature Review

Epidemiological Background

Stress and social support have been found to be associated with low birth weight and preterm birth in several studies. One large mulitsite study, for example, included 2600 women and found a significant relationship between stress and preterm birth after controlling for a variety of confounders. However, the relationship between stress and adverse birth outcomes is somewhat controversial and has been questioned in the literature.

Potential Mechanisms

- Hormonal: Studies have found that women who deliver preterm have higher levels of the primary stress hormone (corticotropin-releasing hormone, CRH) at delivery and that CRH peaks more quickly during the gestational period compared with women who deliver at term. Additional research indicates that the effect of CRH on spontaneous preterm birth occurs independently of other biomedical risk factors and that CRH likely plays an important role in promoting labor.
- Infection: Preliminary investigation indicates that stress suppresses the immune system, potentially heightening a woman's risk for acquisition of genital infection. Bacterial vaginosis is the most common genital infection in women and is associated with a twofold increase in the risk of preterm labor and premature rupture of the membranes. Further investigation on the immune suppression-infection-preterm delivery pathway is needed.
- Vascular: Stress is thought to instigate cardiovascular problems, such as hypertension, and cardiovascular problems are, in turn, a leading cause of elective preterm induction of labor. In addition, pregnant women with hypertension have been found to have higher levels of CRH, which, as mentioned above, may precipitate preterm delivery. Stress-induced hormone release may also cause constriction of blood vessels, limiting oxygen and nutrient delivery from the mother to the fetus through the placenta, thereby slowing fetal growth.
- Behavioral: Women under a high degree of stress may engage in stress-mitigating behaviors, namely tobacco and alcohol use, both of which have been associated with low birth weight. In addition, stress may be associated with unintended pregnancy and attitudes about pregnancy, factors that has been examined in relation to adverse birth outcomes.

For more information, please refer to: Monk C. Stress and Mood Disorders During Pregnancy: Implications for Child Development. Psychiatric Quarterly 2001, 72(4): 347-357/Wadhwa PD, Culhane JF, Rauh V, Barve SS. Stress and Preterm Birth: Neuroendocrine, Immune/Inflammatory, and Vascular Mechanisms. Maternal and Child Health Journal 2001, 5(2):119-125/Sable MR, Wilkinson DS. Impact of Perceived Stress, Major Life Events And Pregnancy Attitudes on Low Birth Weight. Family Planning Perspectives 2000, 32(6):288-294.

Behaviors/Outcomes Associated with Stress During Pregnancy in PRAMS

- **Smoking Last Trimester:** Women under financial stress were 1.6 times* as likely and women with traumatic stress were 2.0 times* as likely to smoke during the last trimester as women who did not report those types of stress. In addition, compared with women who did not report any stressors, those with four or more stressors were 3.6 times* as likely and with three stressors 1.7 times* as likely to smoke in the last trimester.
- **Prenatal Care:** Women with partner associated stress were 1.4 times* as likely and women with financial stress were 1.4 times* as likely to receive prenatal care late or never compared with women who did not experience those categories of stress. Women with four or more reported stressors were 2.0 times* as likely to receive late or no prenatal care as women with no stressors.
- **Birth Outcomes:** Women with higher numbers of total reported stressors exhibited higher likelihood of delivering low birth weight and preterm, although this relationship was not statistically significant after adjusting for other variables.

*Odd ratios significant at p<.05 after adjusting for race, maternal age, and maternal education.

Psychosocial Assessment in Prenatal Care

In a landmark 1989 report, a panel of experts released their recommendations regarding the content of prenatal care *(Public Health Service. Caring for Our Future: The Content of Prenatal Care. Washington, DC: Public Health Service, 1989).* The panel proposed that prenatal care contain a psychosocial assessment and intervention component, and that the psychosocial assessment should include ascertainment of social support structure and stressors experienced. Research indicates that inclusion of psychosocial risk assessment and intervention improves pregnancy outcomes. One study, for example, found that women on Medicaid who received at least one psychosocial assessment each trimester were half as likely to have a low birth weight or preterm delivery than women with inadequate services (*Wilkinson DS, Korenbrot CC, Greene J. A Performance Indicator of Psychosocial Services in Enhanced Prenatal Care of Medicaid-Eligible Women. Maternal and Child Health Journal, 1998, 2(3):131-143*).

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reported one, 17.2 percent reported two, 11.9 percent reported three, and 20.4 percent reported experiencing four or more stressors (Figure 1).

Financial stressors were the most commonly reported (51.9 percent). In addition, 37.0 percent of women experienced emotional stress, 34.5 percent experienced partner associated stress, and 20.2 percent experienced traumatic stress. Of the individual stressors, women were most likely to report having moved to a new address (35.9 percent), having a close family member who was ill and had to be hospitalized (29.5 percent), and arguing with their husbands or partners more than usual during pregnancy (27.3 percent), (Figure 2).

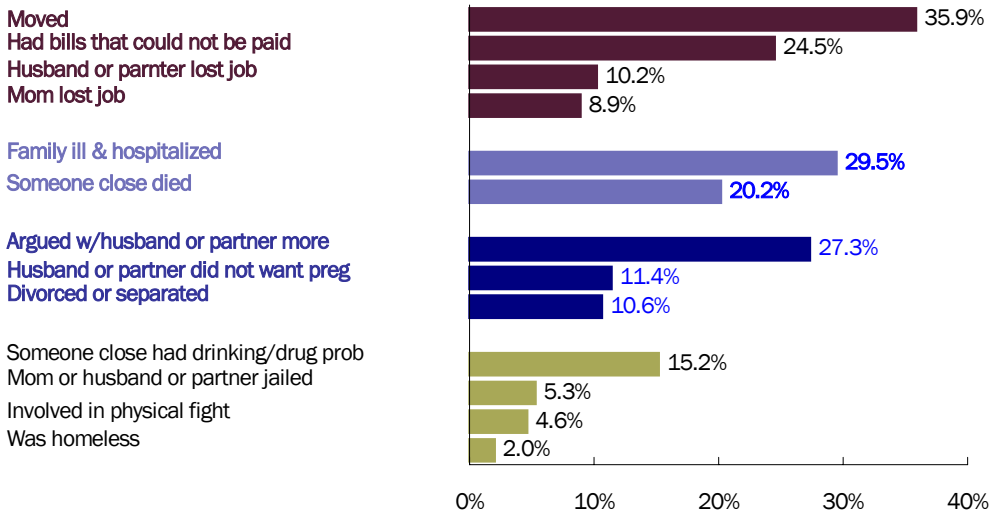
The percentage of women who reported experiencing each of the stressors was relatively stable from 1996 to 2000 for the majority of the thirteen stressors. The prevalence of women reporting traumatic stress, however, declined significantly (p=.007) — from 23.2 percent in 1996 to 18.3 percent in 2000. Specifically, the prevalence of having a close friend with a drinking or drug problem decreased from 16.9 percent to 13.2 percent and of being involved in a physical fight from 5.5 percent to 4.2 percent.

Black women were the most likely to report at least one stressor (83.8 percent) compared with white women (72.2 percent) and women of other races (61.0 percent). The same racial distribution was observed across categories of stressors, with a higher proportion of black women reporting emotional (44.7 percent), partner associated (51.6 percent), financial (59.0 percent), and traumatic (32.1 percent) stressors compared with white women (35.6, 30.8, 50.6, 17.9 percent respectively) and women of other races (21.5, 28.2, 43.0, 11.0 percent, respectively). Black women also reported a greater number of stressors. Whereas 32.6 percent of black women reported experiencing four or more stressors, only 17.9 percent of white women and 12.5 percent of women of other races reported that many.

The youngest and least educated women were most at risk for experiencing stress. Among women 20 years or younger, 34.4 percent reported four or more stressors compared with 11.5 percent of women over 30 years of age. An age discrepancy was also apparent in reported percentages of partner associated (53.1 percent in youngest versus 24.1 percent in oldest), financial (65.8 in youngest versus 38.7 percent in oldest), and traumatic (37.3 percent in youngest versus 11.3 percent in oldest) stressors. A nearly identical pattern was seen in stressors according to education level.

Stress during pregnancy is clearly ubiquitous, but is disproportionately reported among very young women, women who are least educated, and women who are black. Given the potential adverse effect of stress on women's and infants' health, levels of stress should be monitored during prenatal visits, especially in those groups at highest risk of experiencing stress, and stress reduction services should be made available to women who are found to be under high levels of stress. A listing of mental health resources available in Michigan can be found at http://www.mentalhealth.org/databases/kdata.asp?D1=MI.

Figure 2. Prevalence of Life Event Stressors Occurring During Pregnancy, Michigan, 1996-2000



Stressors grouped by category: financial (berry), emotional (light blue), partner associated (dark blue), traumatic (buff)

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Past and future editions of the PRAMS Newsletter will be available electronically. Visit: http://www.michigan.gov/mdch/; choose "Pregnant Women, Children & Families" from the menu on the left; select the "Children & Families" submenu; and click on "PRAMS." If you wish to receive a hard copy in the future, please contact Denise Reinhart at (517) 335-9307 or ReinhartD@michigan.gov.

PRAMS Overview

PRAMS (Pregnancy Risk Assessment and Monitoring System) is a population based survey of maternal experiences and behaviors before and during a woman's pregnancy and during early infancy of her child. African-American women and women who deliver low birth weight infants are over-sampled in order to ensure more accurate estimates. Each year, approximately 1,000-3,000 new mothers are randomly selected from a frame of eligible birth certificates. A survey is mailed out to the women at two to six months after delivery, followed by telephone reminders to those who have not responded. In addition to the mailed surveys, a stratified systematic sample of African-American mothers is selected from six inner-city hospitals, where an initial interview is conducted followed by a mailed survey two to six months later. This is so we can better capture the experiences among African-American mothers and their infants. The results presented are weighted to represent all of Michigan's mothers and infants.

Suggested Citation

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